

# Designing with the Nios II Processor and SOPC Builder

**El Camino**  
Training - Engineering - Consultancy



## Course Description

This course will teach you how to design in a soft core embedded processor with an Altera FPGA. This course is focused on the hands-on development of Nios II hardware and software using the Nios® II Development Kit. You will learn how to integrate a Nios II 32-bit microprocessor and test it in an Altera FPGA. You will learn how to configure and compile designs using the Quartus® II software and SOPC Builder tool as well as how to develop and run embedded software for the Nios II processor in the Nios II Software Build Tools for Eclipse. You will participate in discussions about the features and capabilities of the development board along with how to create and test your own custom IP. After taking this course you should feel confident tackling your next SOPC design.

## Skills Developed

- Configure & compile a Nios II design using SOPC Builder & Quartus II software
- Create software projects using Nios II Software Build Tools for Eclipse
- Compile, run & debug embedded software
- Verify your design with Quartus II software, ModelSim-Altera, & Nios II Software Build Tools for Eclipse
- Use SOPC Builder to incorporate custom peripherals & instructions
- Build custom Avalon-mastering IP
- Utilize Avalon-MM & Avalon-ST interfaces
- Learn to access peripherals from C

## Prerequisites

We recommend completing the following courses:

- The Quartus II Software Design Series: Foundation (Instructor-led Training)
- The Quartus II Software Design Series: Foundation (Online Training)
- Using the Quartus II Software: An Introduction

Course Length	3 days
Language	Presentation in German or English Slides and documentation in English
Platform	PC Windows XP / Windows 7
Pricing	On request
Dates	On request

## Skills Required

- Background in digital logic design
- Working knowledge of the Quartus II design software
- Some knowledge of programming in C for embedded systems

## Exercises

- Creating a Nios II Processor System
- Software Flow
- RTL Simulation
- Adding a User Peripheral
- Custom Instructions
- Flash Programmer
- Building Systems with SOPC Builder
- Attach FIFO and Avalon Components and Test with Software
- Avalon-MM Read Master (and optionally Avalon-MM Write Master) Custom Peripherals
- Add Sequence of Avalon Streaming Peripherals to System with FIFO Buffering on Input and Output Sides

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